What is claimed is:

1. A portable thermal imaging analysis apparatus for analyzing a specimen having a surface, comprising:

a base framework that removably attaches to the specimen;

a frame that slideably attaches to said base framework;

a sound source that mounts to said frame and couples its energy to the specimen;

a thermal imaging camera directed toward the specimen; and

a controller connected to said sound source and said thermal imaging camera.

2. The portable thermal imaging analysis apparatus according to claim 1, wherein said frame is mounted to said base framework via at least one first sliding fitting mounted to said frame, whereby said frame translates along an axis generally parallel to the surface of the specimen.

3. The portable thermal imaging analysis apparatus according to claim 2, wherein said sliding fitting comprises a linear bearing.

4. The portable thermal imaging analysis apparatus according to claim 1, wherein said base framework further comprises at least one first guide rail.

5. The portable thermal imaging analysis apparatus according to claim 4, wherein said first guide rail comprises a structural extrusion.

6. The portable thermal imaging analysis apparatus according to claim 1, further comprising an attaching system for attaching said base framework to the specimen.

7. The portable thermal imaging analysis apparatus according to claim 6, wherein said attaching system operates by vacuum.

8. The portable thermal imaging analysis apparatus according to claim 7, wherein said attaching system further comprises a plurality of vacuum cups.

9. The portable thermal imaging analysis apparatus according to claim 8, wherein said vacuum cups are pivotably attached to said base framework.

10. The portable thermal imaging analysis apparatus according to claim 8, wherein said vacuum cups can be selectably activated.

11. The portable thermal imaging analysis apparatus according to claim 6, wherein said attaching system further comprises a fitting to accept a clamp.

12. The portable thermal imaging analysis apparatus according to claim 10, wherein said base framework further comprises:

a cross rail perpendicular to said first guide rail and roughly parallel to the specimen surface; and

a second sliding fitting slideably connecting said first guide rail to said cross rail.

13. A portable thermal imaging analysis apparatus for analyzing a specimen having a surface, comprising:

means for attaching a thermal imaging analysis apparatus to a specimen;

means for moving a thermal imaging analysis apparatus across a region of the surface of the specimen;

means for generating an acoustic signal with energy content along a motional

axis perpendicular to a surface of a specimen;

means for detecting transient thermal response to stimulation by said generating means; and

means for controlling said generating means and said detecting means.

14. The portable thermal imaging analysis apparatus according to claim 13, wherein said moving means further comprises means for minimizing frictional drag in the moving of said moving means across the region of the surface of the specimen.

15. The portable thermal imaging analysis apparatus according to claim 13, wherein said moving means further comprises:

means for releaseably locking the apparatus in a position.

16. The portable thermal imaging analysis apparatus according to claim 13, wherein said acoustic signal generating means further comprises:

means for pressureably coupling said generating means to the surface of the specimen.

17. The portable thermal imaging analysis apparatus according to claim 13, wherein said detecting means further comprises:

means for storing an image acquired by said detecting means;

means for displaying an image acquired by said detecting means; and

means for joining into a single composite image a plurality of images acquired by said detecting means.

18. A method for portable thermal imaging analysis of a specimen having a surface, comprising the steps of:

attaching a thermal imaging apparatus to a specimen;

repositioning a thermal imaging apparatus at a multiplicity of sites across a region of a specimen;

generating an acoustic signal with energy content along a motional axis generally perpendicular to a surface of a specimen;

detecting thermal response to stimulation by the acoustic signal; and

controlling the acoustical signal generation and image detection operations.

19. The method for thermal imaging according to claim 18, wherein said repositioning step further comprises:

releasing a motion preventing clamp;

moving the thermal imaging apparatus along a guide rail;

positioning the thermal imaging apparatus according to a positioning indicator; and

reapplying the motion preventing clamp.

20. The method for thermal imaging according to claim 18, wherein said repositioning step further comprises:

receiving a command from the control apparatus to advance the thermal imaging apparatus;

overcoming a motion preventer mechanism;

activating a drive mechanism in the required direction to advance the thermal imaging apparatus along a guide rail;

monitoring position until a destination position has been reached;

deactivating the drive mechanism;

reenabling the motion preventer mechanism; and

transmitting a response to the control apparatus that repositioning is complete.

21. A portable thermal imaging analysis apparatus for analyzing a specimen having a surface, comprising:

a base framework that removably attaches to the specimen;

a sound source that mounts to said frame and couples acoustical energy into the specimen, wherein the acoustical energy is characterized by a principal frequency that changes with time;

a thermal imaging camera that captures infrared images of the specimen; and

a controller connected to said sound source and said thermal imaging camera.

22. The portable thermal imaging analysis apparatus according to claim 21, wherein said sound source further comprises:

a linear stroke piston that oscillates at a varying rate under the control of a control apparatus.

23. The portable thermal imaging analysis apparatus according to claim 22, wherein said sound source oscillates at an increasing rate during an activation period.

24. The portable thermal imaging analysis apparatus according to claim 22, wherein said sound source oscillates at frequency that increases as a logarithmic function of time during an activation period.

25. The portable thermal imaging analysis apparatus according to claim 22, wherein said sound source oscillates at frequency that varies over a range of an octave.

26. The portable thermal imaging analysis apparatus according to claim

22, wherein said sound source oscillates at frequency that varies over a range of a decade.

27. The portable thermal imaging analysis apparatus according to claim 22, wherein said sound source emits an output signal that is comprised of a plurality of frequencies simultaneously.

28. The portable thermal imaging analysis apparatus according to claim 22, wherein said sound source emits an output signal that is comprised of a plurality of frequencies emitted sequentially.

29. The portable thermal imaging analysis apparatus according to claim 22, wherein said sound source emits an output signal that is comprised of a fundamental frequency and a plurality of harmonics thereof.

30. The portable thermal imaging analysis apparatus according to claim 22, wherein said sound source emits an output signal comprising:

a fundamental frequency summed with a carrier frequency; and

a plurality of additional frequencies, each of which comprises a harmonic of the fundamental frequency summed with the same carrier frequency.

31. The portable thermal imaging analysis apparatus according to claim 22, wherein said sound source emits an output signal that is comprised of a mixture of frequencies distributed over a range.